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ABSTRACT

This study investigated the effects of instruction in reflective thinking upon impulsive fourth grade students and the transfer effects of this instruction on a classroom social studies test. Thirty impulsive subjects from a white, low socio-economic area school were identified. Treatment and impulsivity were examined as they influenced performance on two dependent measures: the Matching Familiar Figures Test (MFF), and the Social Studies Test (SST). The subjects were pretested with the MFF, provided with training sessions, and posttested with the MFF and the SST. Data was analyzed by analysis of covariance, with age and sex and the two covariates. The major findings of the investigation were interactions between treatment and impulsivity. Trained moderates performed better than their controls, but trained extremes performed worse than their controls on MFF immediate posttest error. The major contribution of the study was the identification of differential effects of training in reflection, and of gradual training in reflection on moderately impulsive and on extremely impulsive students. A bibliography is included. (KSM)

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MODIFICATION OF IMPULSIVE COGNITIVE TEMPO IN FOURTH GRADE CHILDREN AND ITS EFFECTS UPON THEIR PERFORMANCE OF A SOCIAL STUDIES TASK[1]

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MODIFICATION OF IMPULSIVE COGNITIVE TEMPO IN FOURTH GRADE CHILDREN AND ITS EFFECTS UPON THEIR PERFORMANCE OF A SOCIAL STUDIES TASK

Lynne Schwab, University of North Florida

Research from the 1960's and 1970's identified basic strategy differences in decision making between children of different cognitive tempos. These strategy differences strongly affect the accuracy of the child's decison. Children who demonstrate an impulsive decision-making behavior usually select one of the first alternatives they think of when they make decisions or solve problems. This impulsive cognitive tempo is less likely to produce an appropriate response than a reflective cognitive tempo in many intellectual tasks. The reflective strategy usually involves consideration and elimination of alternatives until the best of those available is found. Kagan and Kogan (9) emphasized how much "the degree to which the child pauses to evaluate (his decisions)," is a powerful influence on his thinking processes and products.

..ll individuals are not necessarily either reflective or impulsive. Given these categories, however, much research has been conducted that focuses on those individuals who clearly fall into Kagan's "impulsive" category, that is, those who make decisions more quickly and with a higher rate of error, than their average peer.

Studies (2,6,13) have identified specific differences in viewing patterns between children who tend to be impulsive and those who tend to be reflective. Children who are reflective

observe more, in greater detail, than impulsives. This tends to increase both their time to response as well as their accuracy.

A series of investigations have shown this reflective-impulsive dimension to be generalizable over tasks and stable over time (9,10).

The term "reflective thinking" is also relevant in social studies literature. Smith and Cox (19) suggest social studies educators have looked to psychological foundations for the basis of their current concern about reflectivity. Models of reflective thinking by both psychologists and social studies educators (11 14) have been generic in nature. The reflective strategy used in the present investigation is a specific laboratory model which reflects much of the same patterns.

Attempts to modify cognitive tempo have been of three basic types: (a) time delay, either by imposition or by reinforcement, (10,21,7,4), (b) strategy training (15,20,1,2), and (c) modeling, including direct and indirect (16,5,23,22).

The evidence on attempts to modify impulsivity suggests that teaching specific strategies such as "cue relevance" and scanning strategies appear to be more consistently effective than training for delayed response alone. Modeling has been shown to be a factor, but is not necessarily effective without direct communication of a specific strategy. In addition, personality factors vary the effectiveness of modeling in complex ways which make the effects of modeling difficult to isolate.

This study extended previous studies by increasing the training time and by spreading the nine training periods out over a three-week time period. A further modification was in the

posttesting which included a five week delayed test and a classroom-like Social Studies Test for measuring transfer effects. Finally, this study was the first that separately considered the effects of training upon extremely impulsive and upon moderately impulsive children, and of possible interaction effects between level of impulsivity and type of training.

Experimental Design

This study investigated the effects of instruction in reflective thinking upon impulsive fourth grade students and the transfer effects of this instruction on a classroom-type social studies test. To measure general effects a 3 x 2 factorial design was used. Treatment and impulsivity were examined as they influenced performance on two dependent measures: the Matching Familiar Figures Test and the Social Studies Test. Both dependent measures were administered one week after training and five weeks after training. (See Figure 1.)

	Gradual Increase of Complexity Training	Constant Complexity Training	Control No Training	Total
Extreme Impulsive	n = 5	n = 5	n = 5	n = 15
Moderate Impulsive	n = 5	n = 5	n = 5	n = 15
Total	n = 10	n = 10	n = 10	

Figure 1. Factorial Design for the Study

Subjects

Thirty impulsive students were identified out of 119 4th grade students in a predominantly white, low socio-economic area school. These 30 students were identified on the basis of their pretest MFF scores by using Kagan's criteria of (1) faster response than the median, and (2) more errors than the median. They were separated into 15 moderate impulsives and 15 extreme impulsives using the medians of the impulsive group. One curious finding resulting from this division was that the extreme impulsives tended to be males with higher reading achievement scores and the moderate impulsives tended to be females with lower reading achievement scores. Using Metropolitan Reading Achievement scores, students in each category were blocked into triads and then were distributed randomly to the experimental conditions.

Administration of the Experiment

The model in Figure 2 outlines the procedures: Pretesting with the MFF, matching triads and randomly assigning one of each triad to one of three experimental conditions, providing training sessions for two of the conditions, immediate posttesting with the MFF and the SST, and delayed posttesting with both tests.

MFF Pretest	Match Triads	Randomly Assign to Conditions	Train	Immediate MFF	Immediate SS	Delayed MFF	Delayed SS
All 4th Graders	All Impulsive 4th Graders	1. n = 10	X	X	X	X	X
		2. n = 10	X	X	X	X	X
		3. n = 10		X	X	X	X

Figure 2. Administration of the Experiment

Program Description and Treatments

Training to insure consideration of each alternative before responding consisted of nine 15-minute sessions, administered individually at the rate of three a week for three weeks. Two experimental conditions received training; the third was a control group and received no training. The difference between the two treatments was the amount of complexity of the training items. Complexity is defined here as the number of alternatives per item. Nine training booklets, one for each session, included eight matching-to-sample and three multiple choice items.

The gradual treatment booklets began with two alternatives per item. Those in the constant treatment had four, five or six alternatives depending upon the type of item. The number of alternatives per item in the gradual treatment increased so that by the eighth and ninth sessions, the items had the same number of alternatives as the items in the constant treatment.

Results

Data was analyzed by analysis of covariance, with age and sex as the two covariates. Two hypotheses used pretest MFF error or time score as a third covariate.

INSERT TABLES 1a, 2a ABOUT HERE

Table 1a

Summary of Analyses of Covariance of Scores on the Matching Familiar Figures Test for Three Levels of Treatment by Two Levels of Impulsivity Using Age and Sex as Covariates

Source of Variation	df	Immediate Posttests						Delayed Posttests					
		Error			Time			Error			Time		
		SS	MS	F	SS	MS	F	SS	MS	F	SS	MS	F
Treatment (T)	2	2.03	1.01	<1.00	221.85	105.93	2.84	32.32	16.16	5.32*	42.89	21.34	<1.00
Impulsivity (I)	1	20.82	20.82	4.52*	434.24	434.24	21.11**	14.75	14.75	5.03*	75.80	75.80	3.18
T x I	2	39.82	19.41	4.37*	498.00	269.04	8.68**	14.00	7.00	2.37	156.58	78.29	3.12
Error	22	101.31	4.61		820.04	37.27		64.40	2.93		538.43	24.47	

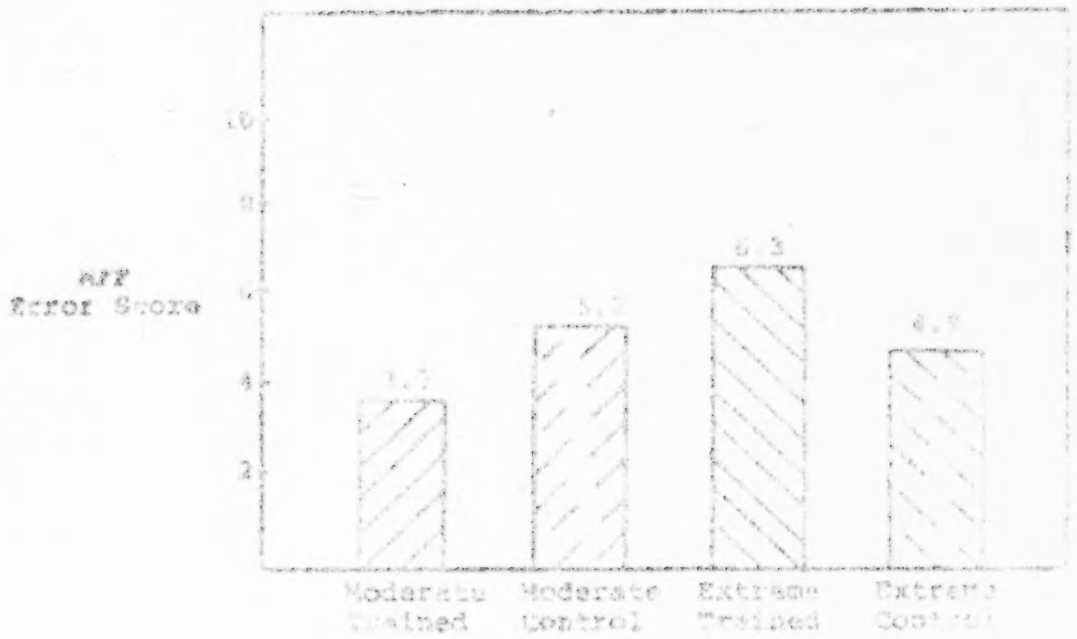
* = p < .05 ** = p < .01

Table 7a

Summary of Analyses of Covariance of Scores on the Matching Familiar Figures Test for Three Levels of Treatment by Two Levels of Impulsivity Using Age, Sex and Pretest MFF Error Score or Time Score as Covariates

Source of Variation	df	Immediate Posttests						Delayed Posttests					
		Error			Time			Error			Time		
		SS	MS	F	SS	MS	F	SS	MS	F	SS	MS	F
Treatment (T)	2	1.74	.87	<1.00	162.65	81.32	2.19	33.00	16.50	5.45*	47.52	23.76	<1.00
Impulsivity (I)	1	7.22	7.22	1.51	107.70	107.70	2.91	11.24	11.24	3.71	25.04	25.04	<1.00
T x I	2	38.35	19.10	4.00*	443.65	221.73	5.99**	14.61	7.31	2.41	152.25	76.12	2.98
Error	21	100.49	4.79		778.18	37.06		63.72	3.03		534.63	25.49	

* = $p < .05$ ** = $p < .01$



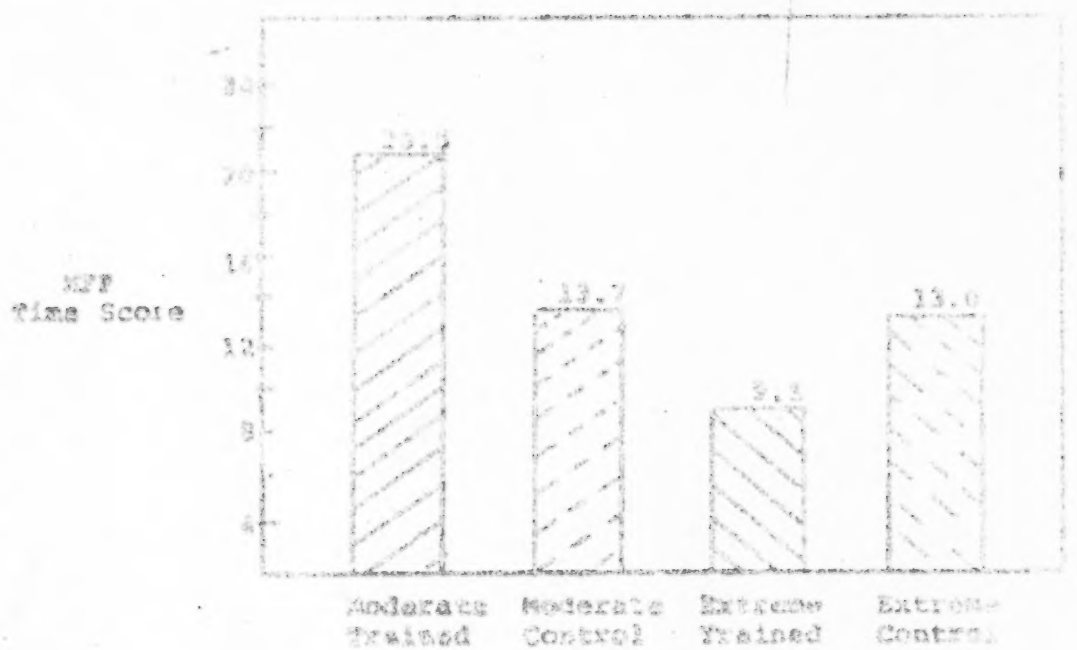


Figure 3. Interaction of Treatment and Impulsivity on the MFF Immediate Posttest

The major findings of the investigation were interactions between treatment and impulsivity. First, trained moderates performed better than their controls, but trained extremes performed worse than their controls on MFF immediate posttest error (.05) and time scores (.01).

INSERT FIGURE 3 ABOUT HERE

Second, moderate impulsives in the gradual treatment made significantly fewer errors (.05) and took more time (.01) on the impulsivity test, the MFF immediate posttest, than moderate impulsives in the constant treatment and in the control condition. The extreme impulsives, on the other hand, generally performed better but not significantly better after training in the constant treatment. There were no consistent significant differences on the social studies transfer test.

INSERT FIGURE 4 ABOUT HERE

Discussion

Studies cited by Kagan and Kogan, as well as studies by Messer,(9, 12, 13) show that students are more reflective when they are anxious about making an error. One speculation is that extreme impulsives may have viewed the gradual treatment booklets, which began with only two alternatives per question, as not very anxiety producing. This study provided no evidence to confirm or deny this possible hypothesis. Evidence did show, however, that for extreme impulsives a gradual treatment increased the tendency for an impulsive response. The opposite finding occurred for the moderate impulsives in the gradual treatment who

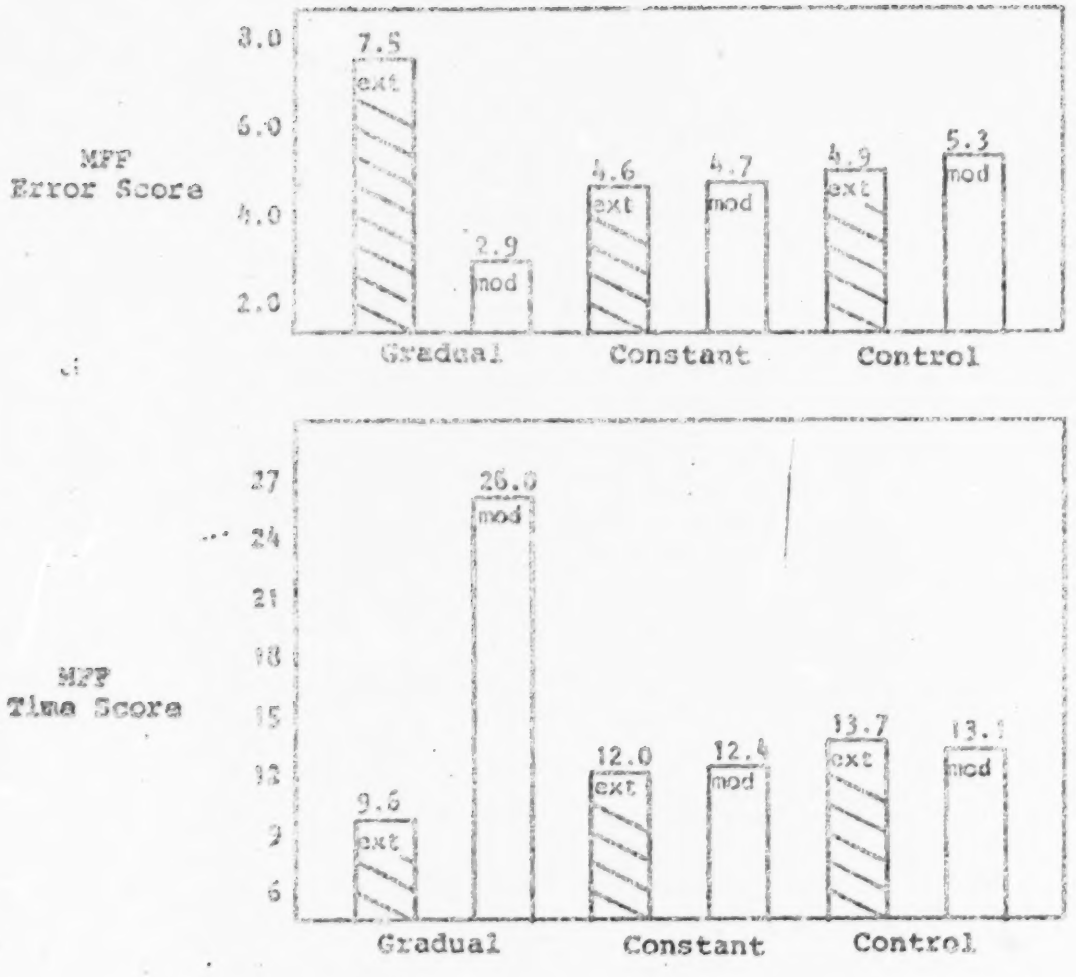


Figure 4. Interaction of Treatment and Impulsivity on the Immediate Posttests When Controlled for the MFF Pretest

scored significantly better on three dependent measures than the moderates in the other treatments.

The major contribution of this study has been the identification of differential effects of training in reflection, and of gradual training in reflection on moderately impulsive and on extremely impulsive students. Future studies might try to replicate these results with training procedures that use more complex reflective strategies, e.g., comparisons of pairs of alternatives, as opposed to comparisons of one alternative to the standard at a time. Another possibly fruitful approach might be to include anxiety measures in the design to investigate the effects of different treatments, including the control treatment, on anxiety. The relationship between anxiety and posttest results might be revealing.

BIBLIOGRAPHY

1. Albert, J. A. Modification of the impulsive conceptual style. (Doctoral dissertation, University of Illinois) Ann Arbor, Mich.: University Microfilms, 1970. No. 70-778.

2. Ayabe, H. I. The effect of reflective and impulsive training on conceptual tempo. (Doctoral dissertation, Indiana University) Ann Arbor, Mich.: University Microfilms, 1969. No. 70-7417.

3. Ayabe, H. I., & Gotts, E. E. (Coordinator) Perceptual development in young children. (Pilot study, Institute for Child Study, Indiana University, Research Relating to Children, Bull. 22) Washington, D.C., United States Government Printing Office, May-December, 1967.

4. Briggs, C. H. An experimental study of reflection-impulsivity in children. (Doctoral dissertation, University of Minnesota) Ann Arbor, Mich.: University Microfilms, 1966. No. 68-1610.

5. Debus, R. L. Effects of brief observation of model behavior on conceptual tempo of impulsive children. Developmental Psychology, 1970, 2(1).

6. Drake, D. M. Perceptual correlates of impulsive and reflective behavior. Developmental Psychology, 1970, 2(2), 202-214.

7. Finney, B. J. The modification of conceptual tempo in disadvantaged boys. (Doctoral dissertation, Case Western Reserve University) Ann Arbor, Mich.: University Microfilms, 1970. No. 70-5016.

8. Kagan, J. Impulsive and reflective children: Significance of conceptual tempo. In J. D. Krumboltz (Ed.), Learning and the educational process. Chicago: Rand McNally, 1965. (b)

9. Kagan, J., & Kogan, N. Individual variation in cognitive processes. In P. H. Mussen (Ed.), Carmichael's manual of child psychology. (3rd ed.) New York: Wiley, 1970.

10. Kagan, J., Pearson, L., & Welch, L. Modifiability of an impulsive tempo. Journal of Educational Psychology, 1966, 57, 359-365. (b)

11. Massialas, B. G. Evaluating social inquiry in the classroom. The High School Journal, 1969, 53 (2), 75-86.

12. Messer, S. B. The effect of anxiety over intellectual performance on reflective and impulsive children. Unpublished doctoral dissertation, Harvard University, 1968.

13. Messer, S. B. The effect of anxiety, over intellectual performance on reflection-impulsivity in children. Child Development, 1970, 41, 723-735. (a)

14. Michaelis, J. U. (Chairman) Statewide Social Science Study Committee. Proposed K-12 social science education framework. Report to the Curriculum Commission and the State Board of Education. Sacramento: State Department of Education, October, 1968.

15. Nelson, T. F. The effects of training in attention deployment on observing behavior in reflective and impulsive children. (Doctoral dissertation, University of Minnesota) Ann Arbor, Mich.: University Microfilms, 1968. No. 68-17, 703.

16. Ridberg, E. H. The modification of cognitive styles through observation of film-mediated models. (Doctoral dissertation, University of Wisconsin) Ann Arbor, Mich.: University Microfilms, 1969. No. 69-22, 462.

17. Ridberg, E. H., Parre, R. D., & Hetherington, E. M. Modification of impulsive and reflective cognitive styles through observation of film mediated models. Developmental Psychology, 1971, 5 (3), 369-377.

18. Siegelman, E. Y. Observing behavior in impulsive and reflective children. Unpublished doctoral dissertation, University of Minnesota, 1966.

19. Smith, F. R., & Cox, B. C. New strategies and curriculum in social studies. J. U. Michaelis (Series Ed.) Series 1. New trends in curriculum and instruction. Chicago, Rand McNally, 1969.

20. Stein, M. L. The modification of impulsivity using two types of cue discrimination training. (Doctoral dissertation, Stanford University) Ann Arbor, Mich.: University Microfilms, 1969. No. 70-10, 532.

21. Weinberg, R. A. The effects of different types of reinforcement in training a reflective conceptual tempo. (Doctoral dissertation, University of Minnesota) Ann Arbor, Mich.: University Microfilms, 1968. No. 69-1560.

22. Woker, G. C. The effect of teacher tempo on the reading progress of reflective and impulsive boys. (Doctoral dissertation, University of Minnesota) Ann Arbor, Mich.: University Microfilms, 1970. No. 71-8236.

23. Yando, R. M., & Kagan, J. The effect of teacher tempo on the child. Child Development, 1968, 39 (1), 27-34.